

# Appendix H

## Noise assessment

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Prepared for Anglican Retirement Villages

**WARRIEWOOD BROOK STAGE 3**

**6-14 MACPHERSON STREET, WARRIEWOOD**

**ACOUSTIC ASSESSMENT**

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**Appendix 1 - Ambient Noise Levels**

## 1 INTRODUCTION

This report presents an analysis of acoustic impacts associated with the retirement village development at Warrewood Brook Retirement Village Stage 3 at 6-14 Macpherson Street, Warrewood

In this report we will

- Conduct an external noise impact assessment (primarily traffic noise) and recommend acoustic treatments to ensure that a reasonable level of amenity is achieved for future tenants
- Identify potential noise sources generated by the site, and determine noise emission goals for the development to meet Council acoustic requirements to ensure that nearby developments are not adversely impacted

## 2 SITE DESCRIPTION / PROPOSED DEVELOPMENT

The subject site is located at 6-14 Macpherson Street, Warrewood

The proposed development consists of two levels of residential development with several common areas on the ground floor including a cafe and lounge

The site is bounded to the south by Macpherson Street which carries medium traffic flows and to the west by Brands Lane, which carries low levels of traffic

The site is bounded to the north and east by existing and future Warrewood Brook Retirement Village stages

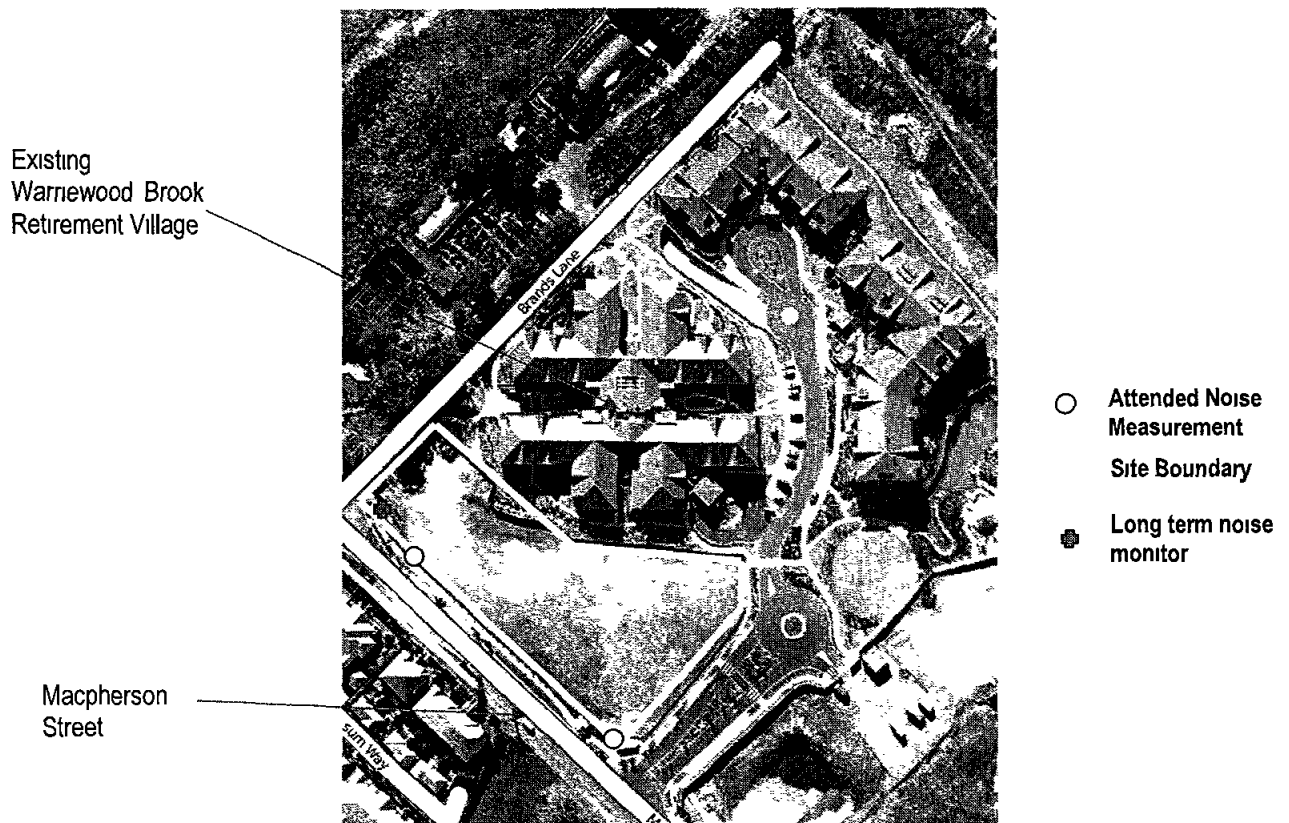


Figure 1 – Site plan

### 3 NOISE DESCRIPTORS

Traffic noise constantly varies in level, due to fluctuations in traffic speed, vehicle types, road conditions and traffic densities. Accordingly, it is not possible to accurately determine prevailing traffic noise conditions by measuring a single, instantaneous noise level. To accurately determine the effects of traffic noise a 15-20 minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters. These parameters are used to measure how much annoyance would be caused by a particular noise source.

In the case of environmental noise three principle measurement parameters are used namely  $L_{10}$ ,  $L_{90}$  and  $L_{eq}$ .

The  $L_{10}$  and  $L_{90}$  measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement interval.

The  $L_{10}$  parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the  $L_{90}$  level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The  $L_{90}$  parameter is used to set the allowable noise level for new potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment particularly during quiet periods, as represented by the  $L_{90}$  level.

The  $L_{eq}$  parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period.  $L_{eq}$  is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment, such is the character of traffic noise.

Current practice favours the  $L_{eq}$  parameter as a means of measuring traffic noise, whereas the  $L_{10}$  parameter has been used in the past and is still incorporated in some codes. For the reasons outlined above the  $L_{90}$  parameter is not used to assess traffic noise intrusion.

## 4 NOISE IMPACT ASSESSMENT

The major noise source in the vicinity of the site is traffic from Macpherson Street which bounds the site to the south

Noise impacts should comply with the requirements of the Pittwater Council DCP and Australian/New Zealand Standard AS/NZS 2107 2000 "Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors"

### 4.1 NOISE MEASUREMENTS

Measurement of external noise was conducted using both long term monitoring and short term hand held measurements

Long term monitoring was conducted using a noise monitor installed on site, at the proposed Macpherson Street façade. Monitoring conducted from 2<sup>nd</sup> to 6<sup>th</sup> August 2010 using an Acoustic Research Laboratories noise monitor set to A-weighted fast response. The monitor was calibrated at the start and end of the monitoring period using a Rion NC-73 calibrator. No significant drift was noted. Noise logger data is provided in Appendix 1.

Short term noise measurements were conducted on 2<sup>nd</sup> August 2010 at two locations on Macpherson Street to supplement the long term monitoring.

**Table 1 – Measured Noise Levels**

Location	Daytime Noise Level dB(A) <sub>Leq 1 hour</sub> (24 hours)	Night Time Noise Level dB(A) <sub>Leq 1 hour</sub> (2200 – 0700)
Macpherson Street façade	61	54

## 4.2 ACOUSTIC OBJECTIVES

As there are no specific noise emission guidelines in the Pittwater Council DCP, the internal traffic noise shall comply with the requirements of Australian/New Zealand Standard AS/NZS 2107 2000 "Acoustics - Recommended Design Sound Levels and Reverberation Times for Building Interiors" and Australian Standard AS 3671-1989 "Acoustics - Road Traffic Noise Intrusion - Building Siting & Construction"

Table 2 details the assessment criteria applicable for the development are provided below

**Table 2 – Traffic Noise Criteria for All Spaces Inside Residential Units**

SPACE/ACTIVITY TYPE	NOISE LEVEL dB(A) $L_{eq}$ (period)
Bedrooms	35 dB(A) $L_{eq}$ (9hr)
Living Areas	40 dB(A) $L_{eq}$ (15hr)

## 4.3 RECOMMENDATIONS

Noise intrusion into the residential units was assessed using the measured external noise levels reported above as the basis. Recommendations have been determined taking into account the orientation of windows, barrier effects (where applicable), the total area of glazing, facade transmission loss and room sound absorption characteristics.

Recommended treatments are set out below

### 4.3.1 Glazing

The table below indicates the glazing types that will be required to achieve the recommended internal noise levels

**Table 3 – Glazing Requirements**

Facade	Room Type	Glazing	Seals
South (Macpherson Street)	Living Room	6mm float / toughened	Yes
	Bedroom	6mm float / toughened	Yes
North, East and West	All	4mm	Yes

The glazing thicknesses recommended are those needed to satisfy acoustic requirements and do not take into account other requirements such as thermal, structural safety or other considerations. These additional considerations may require the glazing thickness to be increased beyond the acoustic requirement.

In addition to complying with the minimum scheduled glazing thickness, the STC rating of the glazing fitted into openable frames and fixed into the building opening should not be lower than the values listed in Table 6 for all rooms. Where nominated, this will require the use of acoustic seals around the full perimeter of openable frames and the frame will need to be sealed into the building opening using a flexible sealant. Note that mohair seals in windows and doors are not acceptable where acoustic seals are required.

**Table 4 – Minimum STC of Glazing**

Glazing Assembly	Acoustic Seals	Minimum STC of Installed Window
4mm	Yes	27
6mm	Yes	29

#### **4.3.2 Walls**

Noise intrusion through the external masonry walls will be negligible and will not contribute to internal noise levels. Similarly, noise intrusion through the concrete slab roof construction will not be significant.

#### **4.3.3 Ventilation**

Internal noise levels complying with acoustic criteria will be achieved only when windows and sliding doors to the apartments are closed. A complying noise level will not be achieved when they are open. Fresh air to apartments or air-conditioning to be installed as per mechanical engineers requirements.



## 5 NOISE EMISSION ASSESSMENT

Noise emissions from the site should be assessed to ensure that the amenity of nearby land users is not adversely affected

Potential noise sources which should be assessed are

- Noise generated by mechanical plant
- Operational noise from outdoor dining areas of the proposed cafe

The nearest potentially effected residential receivers are the houses to south of the site across Macpherson Street

### 5.1 BACKGROUND NOISE MONITORING

Unattended noise monitoring was conducted between the 2<sup>nd</sup> and 6<sup>th</sup> August 2010 using an Acoustic Research Laboratories monitor set on A-weighted fast response mode. The monitor was calibrated before and after the measurements using a Rion Type NC-73 calibrator. No significant drift was recorded.

Measured background noise levels are presented below. Refer to Appendix 1 for unmanned noise monitoring data.

**Table 5 – Measured Background Noise Levels**

Location	Background noise level dB(A) <sub>L90</sub>		
	Daytime (7am-6pm)	Evening (6pm-10pm)	Night (10pm-Midnight)
6-14 Macpherson Street	42	38	35

## 5.2 ACOUSTIC OBJECTIVES

Noise emission controls typically applied by the Pittwater Council are set out below

### 5.2.1 Residential Receivers

*Noise generating plants including pool/spa motors, air conditioning units and the like shall not produce noise levels that exceed 5dBA above the background noise when measured from the nearest property boundary*

These requirements are summarised below

**Table 6 - Acoustic Objectives (Background + 5dB(A))**

Location	Time of Day	dB(A) <sub>Leq</sub>
Macpherson Street Residences	Daytime (7am-6pm)	47
	Evening (6pm-10pm)	43
	Night (10pm-Midnight)	40

## 5.3 RECOMMENDATIONS

### 5.3.1 External Mechanical Plant

Mechanical plant items are not typically selected at DA stage

Detailed review of all external mechanical plant should be undertaken at construction certificate stage (once plant selections and locations are finalised) Acoustic treatments should be determined in order to control plant noise emissions to the levels set out in section 5.2 of this report

All plant can be satisfactorily attenuated to levels complying with noise emission criteria through appropriate location and (if necessary) standard acoustic treatments such as noise screens, enclosures, in-duct treatments (silencers/lined ducting) or similar

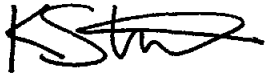
## 6 CONCLUSION

Potential noise impacts from a proposed Stage 3 development of Warriewood Brook Retirement Village at 6-14 Macpherson Street Warriewood have been assessed

Noise impacts from nearby noise sources (primarily traffic noise) on occupants of the development have been assessed in accordance with Pittwater Council DCP guidelines. The acoustic treatments necessary to achieve these guidelines have been set out in section 4

Noise emissions objectives for the site have been determined based on on-site noise logging and noise emission guidelines typically adopted by Council, and have been presented in section 5

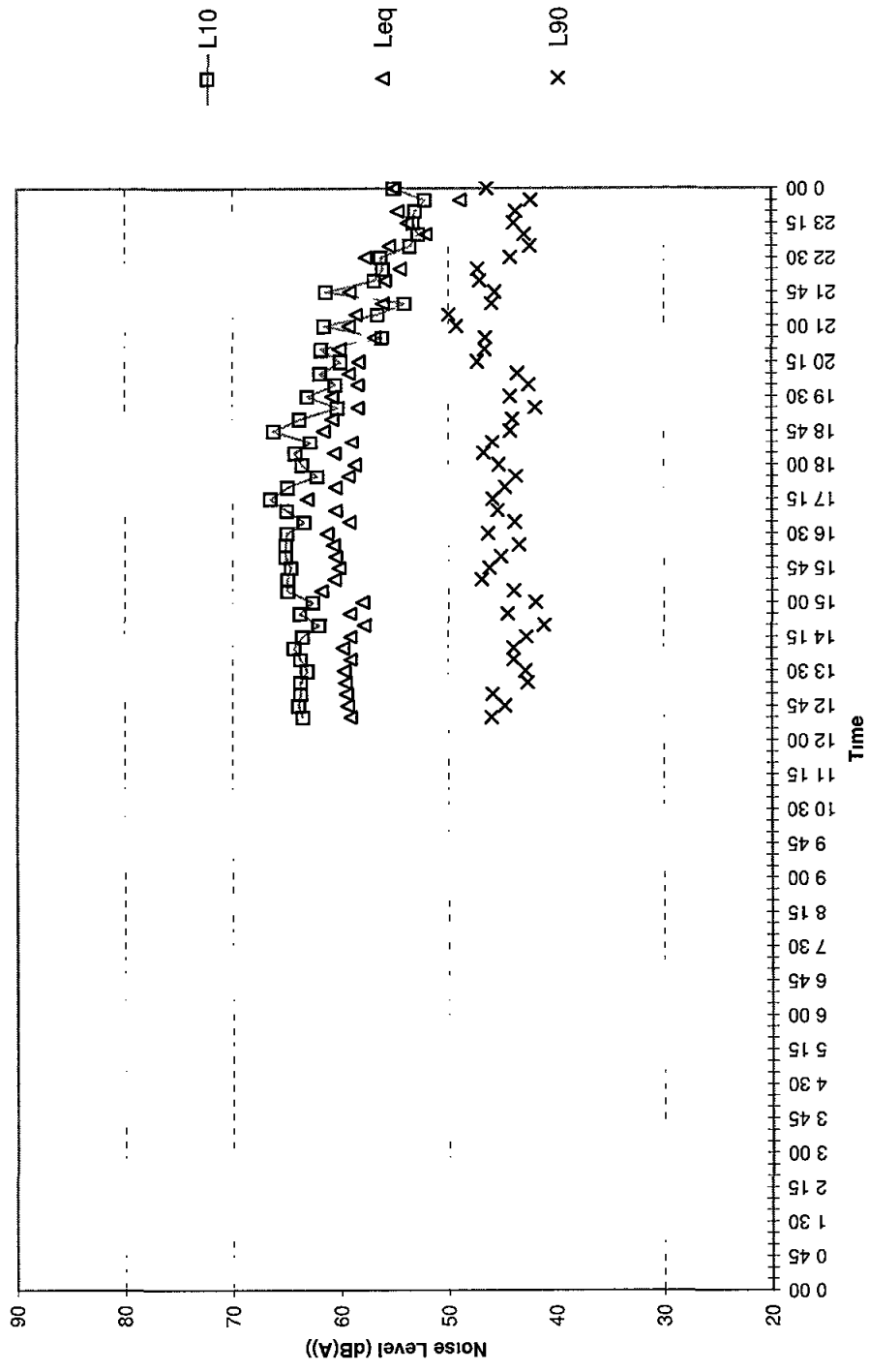
Report prepared by



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Katherine Stewart

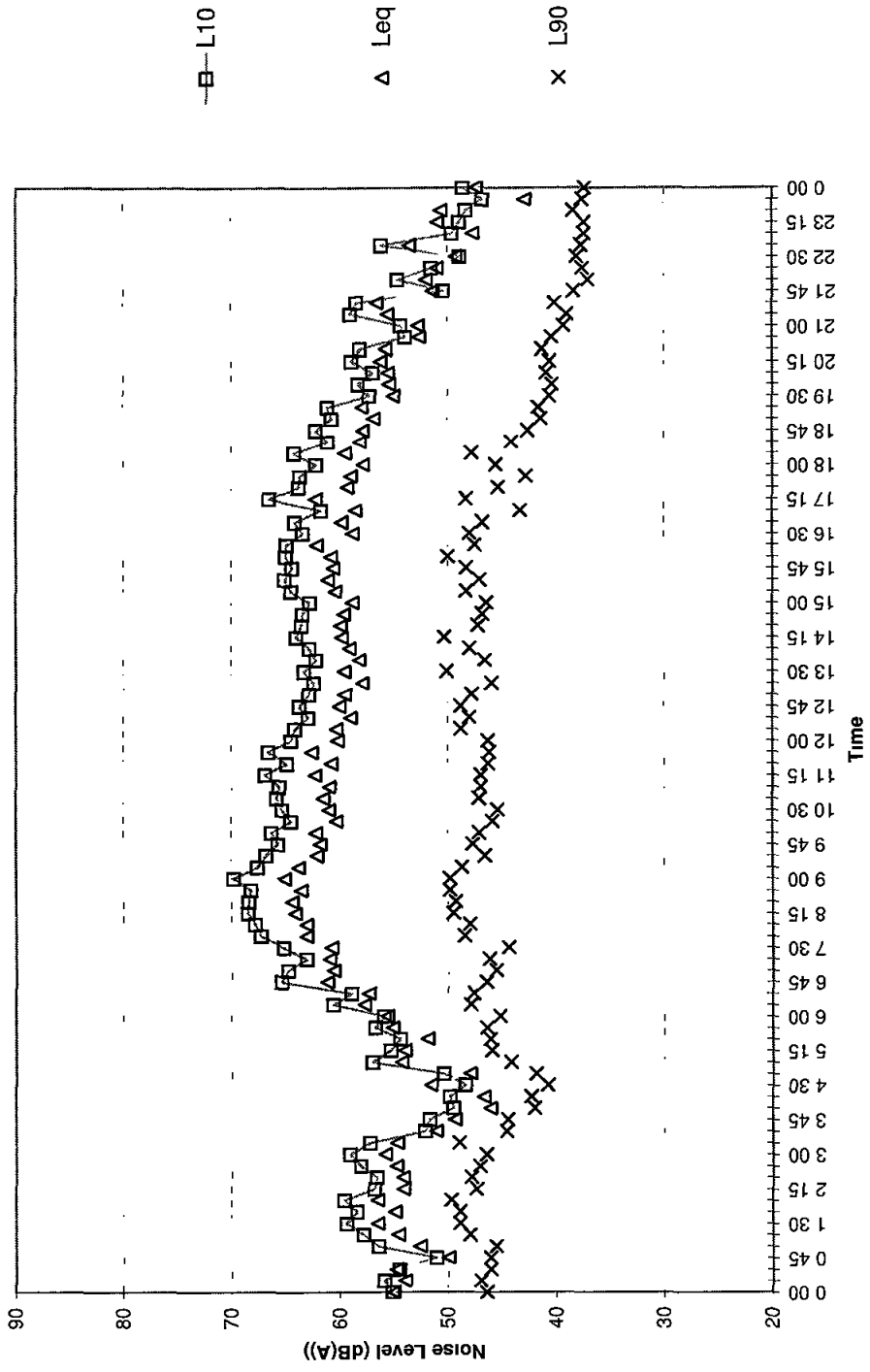
**APPENDIX 1**  
**MEASURED AMBIENT NOISE LEVELS**

**Noise Reading**  
Monday August 2, 2010



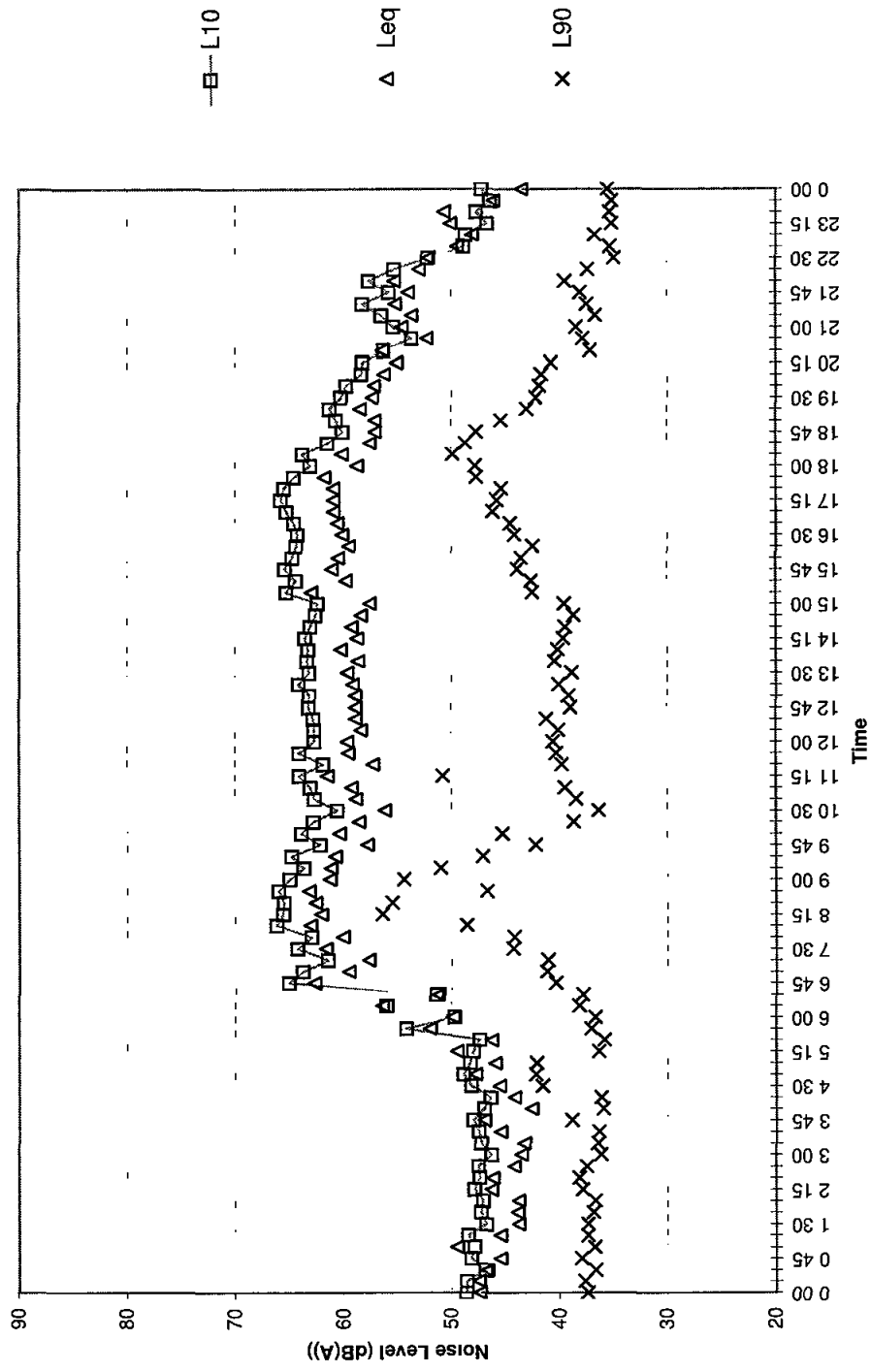
# Noise Reading

Tuesday August 3, 2010



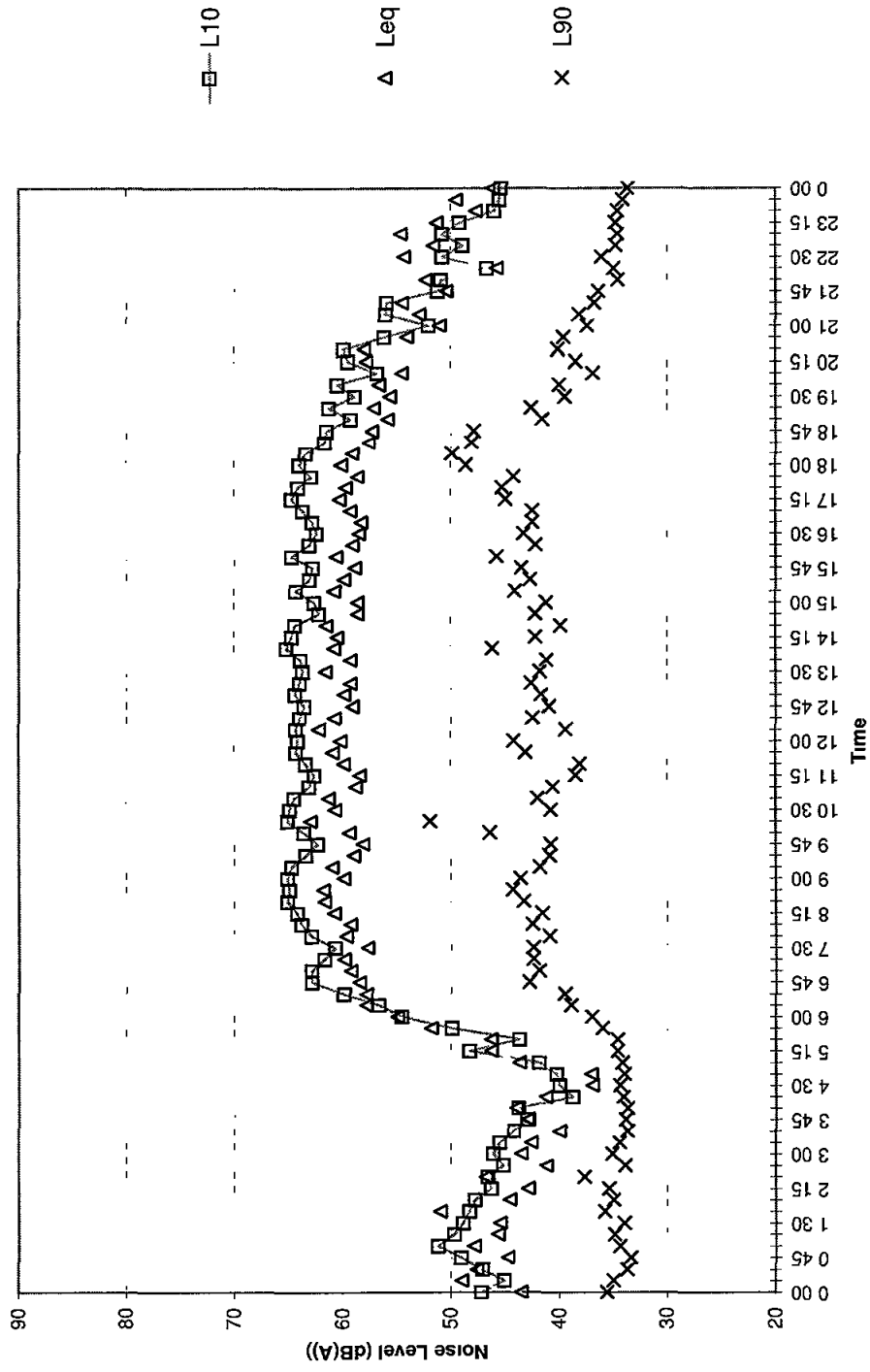
# Noise Reading

Wednesday August 4, 2010



# Noise Reading

Thursday August 5, 2010





# Noise Reading

Friday August 6, 2010

